

Article 34 Amendment (1/2): marked

#### DESCRIPTION

TELEPHONE DISPLAYING LOCAL TIME AT OTHER END OF CONNECTION,  
AND RELATED METHODS AND COMPUTER PROGRAMS

#### TECHNICAL FIELD

The present invention relates to telephones, and particularly to technology for displaying the local time at the other end of the connection.

#### BACKGROUND ART

These days, international telephone rates are becoming cheaper, providing most people with the opportunity to freely make international calls.

While telephone manners dictate that it is preferable to avoid making non-urgent calls late at night or during mealtimes, this requires a caller placing an international call to an area in a different time zone to make a judgment based on the local time at the other end of the connection.

There exist conventional telephones designed to facilitate this process that use the country code included in the telephone number, or a combination of the country code and the area code which follows the country code, to deduce the local time at the other end of the connection prior to making the call, and furnish the caller with the deduced time (e.g. see Japanese Published Patent Application No. 2002-171334).

However, a problem with these conventional telephones is that they are unable to properly display the local time at the other end if the telephone being called is a mobile telephone equipped with an international roaming function, for example.

Mobile telephones equipped with an international roaming function can be called using the same telephone number as that used domestically, merely by being connected to a local communication system in the area to which the user moves. For this reason, there is no way of working out from the telephone number where the mobile telephone (i.e. the local time) is currently being used.

#### DISCLOSURE OF THE INVENTION

In view of the above problem, the present invention aims to provide a telephone capable of properly providing a caller with the local time at the other end of the connection, when the callee's telephone does not give any clues for deducing the local time from the telephone number, as is the case with mobile telephones equipped with an international roaming function, for example, and to provide related methods.

To resolve the above problem, a telephone of the present invention is for displaying a local time of a locality of a callee, and includes an acquiring unit operable to acquire region information relating to the locality of the callee, a storage unit operable to store the region information in association with the callee, a calculating unit operable to calculate the local time using the stored region information,

and a display unit operable to display the local time.

According to this structure, it is possible, by acquiring region information, to find out the callee's locality even if the telephone number of the callee's telephone does not include information relating to the locality, and thus to correctly calculate and display the local time.

~~Also, the telephone may further include a storage unit operable to store the acquired region information, and the calculating unit may calculate the local time using the region information stored in the storage unit.~~

Since the region information according to this structure does not need to be inputted every time the local time is displayed, the time and effort required by the user can be greatly reduced in the case of the user inputting the region information manually, for example. By updating the region information only when the callee shifts time zones, the user is always able to obtain the correct local time of the callee.

Also, the region information may be transmitted from a telephone of the callee represented by a modulation signal in an audible frequency band, and the acquiring unit may receive the modulation signal and acquire the region information by decoding the received modulation signal.

Alternatively, the region information may be transmitted from a telephone of the callee represented by an electronic mail, and the acquiring unit may acquire the region information by receiving the email.

Since the region information according to these structures is acquired from the callee's telephone, the user is not required to input the region information manually. Since region information represented by a modulation signal can be acquired through an audio line, it is possible to acquire region information even from mobile telephones in regions where a data line cannot be used. Furthermore, region information represented by an email is ideal when the region information is acquired from a mobile telephone in a different time zone.

Also, the region information may be recorded in a location register that manages a ~~movement~~locality of the telephone of the callee in a telephone network, and the acquiring unit may acquire the region information from the location register via the telephone network.

Also, the acquiring unit may acquire the region information as a reply to a callout to the telephone of the callee, and the telephone may further include a reception unit operable to receive a user operation after the display of the local time, the operation being one of approving and canceling a call, and an instructing unit operable to instruct the telephone network to one of approve and cancel the call, upon receipt of the user operation.

Since the region information according to these structures is acquired from a location register, the user is not required to input the region information manually. Since region information expressing the latest locality of the callee is managed in the location register in connection

with the location registration of the mobile telephone, the correct local time is always displayed by using the region information.

In particular, if the telephone network is configured to notify the region information to the telephone in response to a callout to the callee and to place a call to the callee's telephone after receiving an instruction approving the call, the user can determine whether or not to make the call based on the latest local time displayed after dialing.

A telephone of the present invention is for use in a plurality of time-zones, and includes an acquiring unit operable to acquire region information relating to a locality of the telephone, and a notifying unit operable to notify the acquired region information to another telephone.

Also, the notifying unit may perform the notification by transmitting the region information to the other telephone represented by a modulation signal in an audible frequency band.

Alternatively, the notifying unit may perform the notification by transmitting the region information to the other telephone represented by an email.

By notifying its locality to the other telephone, the telephone is, according to these structures, able to have the other telephone correctly display the local time at the locality of the telephone. Also, the above-mentioned effects are obtained as a result of transmitting the region information represented by a modulation signal or an email.

A telephone network of the present invention ~~for~~

~~managing a movement of~~that includes a first telephone for use in a first country and usable in a second country through international roaming, a second telephone for use in the first country, a first base station installed in the first country, a first exchange center installed in the first country, a home location register installed in the first country, a second base station installed in the second country, and a second exchange center installed in the second country, and. The first exchange center includes a location registration unit operable to receive via the second base station and the second exchange center a request for location registration from the first telephone being used in the second country through international roaming, and to record region information relating to a locality of the first telephone in the home location register, a reception unit operable to receive from anotherthe second telephone via the first base station, specification information specifying the first telephone, and a notifying unit operable to notify the region information relating to the locality of the first telephone recorded in the home location register to the other second telephone, upon receipt ofbased on the received specification information.

Also, the reception unit may receive the specification information from the second telephone as a callout request to the first telephone, and the telephone networkfirst exchange center may further include ~~a waiting unit operable to wait for an instruction from the other telephone after the notification of the region information, the instruction~~

~~being one of approving and canceling a call, and a call unit operable to call the first telephone via the second exchange center and the second base station if the instruction approving the call is received or if a predetermined time period elapses without receiving the an instruction canceling the call from the second telephone after notifying the region information to the second telephone.~~

According to these structures, the local time at the locality of the telephone can be correctly displayed on another telephone as a result of the telephone network notifying the locality to the other telephone. Since the telephone network is able to provide the latest region information obtained as a result of the location registration, the other telephone is always able to display the correct local time based on the region information. Also, the effects described above are obtained by placing a call to the callee after receiving approval from the other telephone.

A telephone system of the present invention includes a first telephone for use in a plurality of time zones, and a second telephone for displaying a local time of a locality of the first telephone. The first telephone includes a first acquiring unit operable to acquire region information relating to a locality of the first telephone, and a notifying unit operable to notify the region information to the second telephone. The second telephone includes a second acquiring unit operable to acquire the region information from the first telephone, a calculating unit operable to calculate the local time using the region information, and a display

unit operable to display the local time.

A telephone system of the present invention includes a telephone network for managing a movement of a first telephone, and a second telephone for displaying a local time of a locality of the first telephone. The telephone network includes a location registration unit operable to record region information relating to the locality of the first telephone, a reception unit operable to receive from the second telephone, specification information specifying the first telephone, and a notifying unit operable to notify the region information to the second telephone, upon receipt of the specification information. The second telephone includes an acquiring unit operable to acquire the region information from the telephone network, a storage unit operable to store the region information in association with a callee, a calculating unit operable to calculate the local time using the stored region information, and a display unit operable to display the local time.

Also, the reception unit may receive the specification information from the second telephone as a callout request to the first telephone, and the telephone network may further include ~~a waiting unit operable to wait for an instruction from the second telephone after the notification of the region information, the instruction being one of approving and canceling a call, and a call unit operable to call the first telephone if the instruction approving the call is received or if a predetermined time period elapses without receiving thean instruction canceling the call~~from the



second telephone after notifying the region information to the second telephone.

According to these structures, the effects described above are obtained in the telephone system.

A method of the present invention is a display method for displaying a local time of a callee performed in a telephone, and includes the steps of acquiring region information relating to a locality of the callee, storing the region information in association with the callee, calculating the local time using the stored region information, and displaying the local time.

~~Also, the method may include the further step of storing the region information, and the local time may be calculated using the stored region information.~~

A method of the present invention is a notification method for notifying a locality performed in a telephone for use in a plurality of time zones, and includes the steps of acquiring region information relating to a locality of the telephone, and notifying the region information to another telephone.

A method of the present invention is a notification method for notifying a locality of a first telephone to a second telephone performed in a telephone network that ~~manages a movement of~~ includes the first telephone, which is for use in a first country and is usable in a second country through international roaming, the second telephone, which is for use in the first country, a first base station installed in the first country, a first exchange center installed in

the first country, a home location register installed in the first country, a second base station installed in the second country, and a second exchange center installed in the second country, and. The method includes the steps of receiving via the second base station and the second exchange center a request for location registration from the first telephone being used in the second country through international roaming, and recording region information relating to the locality of the first telephone in the home location register; receiving from another the second telephone via the first base station, specification information specifying the first telephone; and notifying the region information relating to the locality of the first telephone recorded in the home location register to the other second telephone, upon receipt of based on the received specification information.

Also, the specification information may be received from the second telephone as a callout request to the first telephone, and the method may include the further steps of ~~waiting for an instruction from the other telephone after the notification of the region information, the instruction being one of approving and canceling a call, and calling the first telephone if the instruction approving the call is received or a predetermined time period elapses without receiving the an instruction canceling the call from the second telephone after notifying the region information to the second telephone.~~

A method of the present invention is a display method for having a second telephone displaying a local time of a

locality of a first telephone performed in a telephone system that includes the first telephone, which is for use in a plurality of time zones, and at the second telephone. The method includes the steps of acquiring, in the first telephone, region information relating to the locality of the first telephone; notifying the region information from the first telephone to the second telephone; acquiring, in the second telephone, the region information from the first telephone; calculating, in the second telephone, the local time using the region information; and displaying, in the second telephone, the local time.

A method of the present invention is a display method for displaying a local time of a locality of a first telephone performed in a telephone system that includes a second telephone and a telephone network for managing a movement of the first telephone. The method includes the steps of recording, in the telephone network, region information relating to the locality of the first telephone; receiving, in the telephone network, specification information specifying the first telephone from the second telephone; notifying the region information ~~from the telephone network~~ to the second telephone, upon receipt of the specification information; acquiring, in the second telephone, the region information from the telephone network; storing, in the second telephone, the region information in association with a callee; calculating, in the second telephone, the local time using the stored region information; and displaying, in the second telephone, the local time.

Also, the specification information may be received from the second telephone as a callout request to the first telephone, and the method may include the further steps of ~~waiting, in the telephone network, for an instruction from the second telephone after the notification of the region information, the instruction being one of approving and canceling a call, and calling, in the telephone network, the first telephone if the instruction approving the call is received or~~ a predetermined time period elapses without receiving ~~thean~~ an instruction canceling the call from the second telephone after notifying the region information to the second telephone.

A computer program of the present invention may be a machine-readable program for causing a computer to execute the steps included in any of the above methods.

~~—The same effects as for the telephone are obtained with the methods and computer programs.~~

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig.1 is a functional block diagram showing the overall structure of a telephone of embodiment 1;

## CLAIMS

1. (Currently Amended) A telephone for displaying a local time of a locality of a callee, comprising:

an acquiring unit operable to acquire region information relating to the locality of the callee;

a storage unit operable to store the region information in association with the callee;

a calculating unit operable to calculate the local time using the stored region information; and

a display unit operable to display the local time.

2. (Cancelled)

3. (Currently Amended) The telephone of claim 1, wherein ~~the region information is transmitted from a telephone of the callee represented by a modulation signal in an audible frequency band, and~~

the acquiring unit receives in an audible frequency band from a telephone of the callee ~~the~~ a modulation signal representing the region information, and acquires the region information by decoding the received modulation signal.

4. (Currently Amended) The telephone of claim 1, wherein the region information is transmitted from a telephone of the callee represented by an electronic mail, and

the acquiring unit acquires the region information by receiving from a telephone of the callee ~~the~~ an electronic mail in which the region information is described.

5. (Currently Amended) The telephone of claim 1, wherein  
the region information is recorded in a location  
register that manages a ~~movement~~locality of the telephone  
of the callee in a telephone network, and

the acquiring unit acquires the region information from  
the location register via the telephone network.

6. (Currently Amended: Japanese Only) The telephone of claim  
5, wherein

the acquiring unit acquires the region information as  
a reply to a callout to the telephone of the callee, and  
the telephone further comprises:

a reception unit operable to receive a user operation  
after the display of the local time, the operation being one  
of approving and canceling a call; and

an instructing unit operable to instruct the telephone  
network to one of approve and cancel the call, upon receipt  
of the user operation.

7. (Currently Amended: Japanese Only) A telephone for use  
in a plurality of time zones, comprising:

an acquiring unit operable to acquire region  
information relating to a locality of the telephone; and

a notifying unit operable to notify the acquired region  
information to another telephone.

8. (Currently Amended: Japanese Only) The telephone of claim

7, wherein the notifying unit performs the notification by transmitting the region information to the other telephone represented by a modulation signal in an audible frequency band.

9. (Currently Amended: Japanese Only) The telephone of claim 7, wherein the notifying unit performs the notification by transmitting the region information to the other telephone represented by an electronic mail.

10. (Currently Amended) A telephone network ~~for managing a movement of that~~ includes a first telephone for use in a first country and usable in a second country through international roaming, a second telephone for use in the first country, a first base station installed in the first country, a first exchange center installed in the first country, a home location register installed in the first country, a second base station installed in the second country, and a second exchange center installed in the second country, the first exchange center comprising:

a location registration unit operable to receive via the second base station and the second exchange center a request for location registration from the first telephone being used in the second country through international roaming, and to record region information relating to a locality of the first telephone in the home location register;

a reception unit operable to receive from another the

second telephone via the first base station, specification information specifying the first telephone; and

a notifying unit operable to notify the region information relating to the locality of the first telephone recorded in the home location register to the ~~other~~second telephone, ~~upon receipt of~~based on the received specification information.

11. (Currently Amended) The telephone network of claim 10, wherein

the reception unit receives the specification information from the second telephone as a callout request to the first telephone, and

the ~~telephone network~~first exchange center further comprises:

~~— a waiting unit operable to wait for an instruction from the other telephone after the notification of the region information, the instruction being one of approving and canceling a call; and~~

a call unit operable to call the first telephone via the second exchange center and the second base station ~~if the instruction approving the call is received or if a~~ predetermined time period elapses without receiving ~~the an~~ instruction canceling the call from the second telephone after notifying the region information to the second telephone.

12. (Currently Amended: Japanese Only) A telephone system



comprising a first telephone for use in a plurality of time zones, and a second telephone for displaying a local time of a locality of the first telephone,

the first telephone including:

a first acquiring unit operable to acquire region information relating to a locality of the first telephone; and

a notifying unit operable to notify the region information to the second telephone, and

the second telephone including:

a second acquiring unit operable to acquire the region information from the first telephone;

a calculating unit operable to calculate the local time using the region information; and

a display unit operable to display the local time.

13. (Currently Amended) A telephone system comprising a telephone network for managing a movement of a first telephone, and a second telephone for displaying a local time of a locality of the first telephone,

the telephone network including:

a location registration unit operable to record region information relating to the locality of the first telephone;

a reception unit operable to receive from the second telephone, specification information specifying the first telephone; and

a notifying unit operable to notify the region information to the second telephone, upon receipt of the

specification information, and

the second telephone including:

an acquiring unit operable to acquire the region information from the telephone network;

a storage unit operable to store the region information in association with a callee;

a calculating unit operable to calculate the local time using the stored region information; and

a display unit operable to display the local time.

14. (Currently Amended) The telephone system of claim 13, wherein

the reception unit receives the specification information from the second telephone as a callout request to the first telephone, and the telephone network further comprises:

~~— a waiting unit operable to wait for an instruction from the second telephone after the notification of the region information, the instruction being one of approving and canceling a call; and~~

a call unit operable to call the first telephone ~~if the instruction approving the call is received or if a~~ predetermined time period elapses without receiving ~~the an~~ instruction canceling the call from the second telephone after notifying the region information to the second telephone.

15. (Currently Amended) A method for displaying a local time

of a callee performed in a telephone, comprising the steps of:

acquiring region information relating to a locality of the callee;

storing the region information in association with the callee;

calculating the local time using the stored region information; and

displaying the local time.

16. (Cancelled)

17. (Currently Amended: Japanese Only) A method for notifying a locality performed in a telephone for use in a plurality of time zones, comprising the steps of:

acquiring region information relating to a locality of the telephone; and

notifying the region information to another telephone.

18. (Currently Amended) A method for notifying a locality of a first telephone to a second telephone performed in a telephone network ~~for managing a movement of~~ that includes the first telephone, which is for use in a first country and is usable in a second country through international roaming, the second telephone, which is for use in the first country, a first base station installed in the first country, a first exchange center installed in the first country, a home location register installed in the first country, a second

base station installed in the second country, and a second exchange center installed in the second country, comprising the steps of:

receiving via the second base station and the second exchange center a request for location registration from the first telephone being used in the second country through international roaming, and recording region information relating to the locality of the first telephone in the home location register;

receiving from ~~another~~ the second telephone via the first base station, specification information specifying the first telephone; and

notifying the region information relating to the locality of the first telephone recorded in the home location register to the ~~other~~ second telephone, ~~upon receipt of~~ based on the received specification information.

19. (Currently Amended) The method of claim 18, wherein the specification information is received from the second telephone as a callout request to the first telephone, and

the method comprises the further steps of:

~~waiting for an instruction from the other telephone after the notification of the region information, the instruction being one of approving and canceling a call; and~~

calling the first telephone if ~~the instruction approving the call is received or~~ a predetermined time period elapses without receiving ~~the an~~ instruction ~~canceling the~~

call from the second telephone after notifying the region information to the second telephone.

20. (Currently Amended) A method for having a second telephone displaying a local time of a locality of a first telephone performed in a telephone system that includes the first telephone, which is for use in a plurality of time zones, and at the second telephone, comprising the steps of:

acquiring, in the first telephone, region information relating to the locality of the first telephone;

notifying the region information from the first telephone to the second telephone;

acquiring, in the second telephone, the region information from the first telephone;

calculating, in the second telephone, the local time using the region information; and

displaying, in the second telephone, the local time.

21. (Currently Amended) A method for displaying a local time of a locality of a first telephone performed in a telephone system that includes a second telephone and a telephone network for managing a movement of the first telephone, comprising the steps of:

recording, in the telephone network, region information relating to the locality of the first telephone;

receiving, in the telephone network, specification information specifying the first telephone from the second telephone;

notifying the region information ~~from the telephone network~~ to the second telephone, upon receipt of the specification information;

acquiring, in the second telephone, the region information from the telephone network;

storing, in the second telephone, the region information in association with a callee;

calculating, in the second telephone, the local time using the stored region information; and

displaying, in the second telephone, the local time.

22. (Currently Amended) The method of claim 21, wherein the specification information is received from the second telephone as a callout request to the first telephone, and

the method comprises the further steps of:

~~— waiting, in the telephone network, for an instruction from the second telephone after the notification of the region information, the instruction being one of approving and canceling a call; and~~

calling, in the telephone network, the first telephone if ~~the instruction approving the call is received or a predetermined time period elapses without receiving the~~ instruction canceling the call from the second telephone after notifying the region information to the second telephone.

23. (Currently Amended) A ~~machine-executable~~ computer

~~program for~~that causes a telephone to execute display processing for displaying a local time of a callee~~in a telephone, the computer program causing a computer to execute~~display processing comprising the steps of:

acquiring region information relating to a locality of the callee;

storing the region information in association with the callee;

calculating the local time using the stored region information; and

displaying the local time.

24. (Cancelled)

25. (Currently Amended) A ~~machine-executable~~ computer program ~~for notifying a locality in~~that causes a telephone for use in a plurality of time zones to execute notification processing for notifying a locality to another telephone, the ~~computer program causing a computer to execute~~notification processing comprising the steps of:

acquiring region information relating to a locality of telephone; and

notifying the region information to ~~another~~the other telephone.

26. (Currently Amended) A ~~machine-executable~~ computer program that causes a first exchange center to execute notification processing for notifying a locality of a first

telephone to a second telephone performed in a telephone network that ~~manages a movement of~~ includes the first telephone, which is for use in a first country and is usable in a second country through international roaming, the second telephone, which is for use in the first country, a first base station installed in the first country, a first exchange center installed in the first country, a home location register installed in the first country, a second base station installed in the second country, and a second exchange center installed in the second country, the ~~computer program causing a computer to execute~~ notification processing comprising the steps of:

receiving via the second base station and the second exchange center a request for location registration from the first telephone being used in the second country through international roaming, and recording region information relating to the locality of the first telephone in the home location register;

receiving from ~~another~~ the second telephone via the first base station, specification information specifying the first telephone; and

notifying the region information relating to the locality of the first telephone recorded in the home location register to the ~~other~~ second telephone, ~~upon receipt of~~ based on the received specification information.

27. (Currently Amended) The computer program of claim 26, wherein



the specification information is received from the second telephone as a callout request to the telephone, and

~~the computer program causes the computer to execute~~ notification processing comprises the further steps of:

~~— waiting for an instruction from the other telephone after the notification of the region information, the instruction being one of approving and canceling a call; and~~

calling the first telephone if ~~the instruction approving the call is received or a predetermined time period elapses without receiving the an instruction canceling the call~~ from the second telephone after notifying the region information to the second telephone.

28. (Currently Amended) A ~~machine-executable~~ computer program that causes a telephone system to execute display processing for having a second telephone displaying a local time of a locality of a first telephone performed in at the telephone system that includes the first telephone, which is for use in a plurality of time zones, and at the second telephone, the computer program causing a computer to execute display processing comprising the steps of:

acquiring, in the first telephone, region information relating to the locality of the first telephone;

notifying the region information from the first telephone to the second telephone;

acquiring, in the second telephone, the region information from the first telephone;

calculating, in the second telephone, the local time using the region information; and

displaying, in the second telephone, the local time.

29. (Currently Amended) A ~~machine-executable~~ computer program that causes a telephone system to execute display processing for displaying a local time of a locality of a first telephone, ~~in~~ at the telephone system ~~that includes~~ including a second telephone and a telephone network for managing a movement of the first telephone, the ~~computer program causing a computer to execute~~ display processing comprising the steps of:

recording, in the telephone network, region information relating to the locality of the first telephone;

receiving, in the telephone network, specification information specifying the first telephone from the second telephone;

notifying the region information ~~from the telephone network~~ to the second telephone, upon receipt of the specification information;

acquiring, in the second telephone, the region information from the telephone network;

storing, in the second telephone, the region information in association with a callee;

calculating, in the second telephone, the local time using the stored region information; and

displaying, in the second telephone, the local time.

30. (Currently Amended) The computer program of claim 29, wherein

the specification information is received from the second telephone as a callout request to the first telephone, and

~~the computer program causes the computer to executedisplay processing comprises the further steps of:~~  
~~— waiting, in the telephone network, for an instruction from the second telephone after the notification of the region information, the instruction being one of approving and canceling a call; and~~

calling, in the telephone network, the first telephone if ~~the instruction approving the call is received or a predetermined time period elapses without receiving thean~~ instruction canceling the call from the second telephone after notifying the region information to the second telephone.

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